REMARKS

Claims 1-4 and 6-9 are pending in this application. By this amendment, Applicant amends claim 1 and cancels claim 5.

Claims 1-9 were rejected under 35 U.S.C. § 102(a) as being anticipated by Kadota et al. (DE 44 00 980). Applicant respectfully traverses this rejection.

Claim 1 recites:

> "A surface acoustic wave device comprising:
> a quartz substrate;
> **a piezoelectric thin film disposed on the quartz substrate and having a positive temperature coefficient of delay**; and
> an interdigital electrode disposed in contact with the piezoelectric thin film; wherein
> **the quartz substrate has an angle ϕ at the Euler angle (0, ϕ, θ) which is selected such that the quartz substrate has a negative temperature coefficient of delay at a predetermined propagation direction θ, and the piezoelectric thin film has a thickness H which is selected such that a fundamental mode of a leaky surface acoustic wave is excited on the quartz substrate and the surface acoustic wave device operates using the fundamental mode of the leaky surface acoustic wave; and**
> **the propagation direction θ is in a range of about 85° to about 95°**." (Emphasis added).

The Examiner alleged that Kadota et al. (DE '980) teaches a SAW device using ZnO (positive tcd) on Quartz (negative tcd) using leaky waves. Applicant respectfully disagrees.

In contrast to the present claimed invention, Kadota et al. (DE 980) (and corresponding USP 5,432,392) teaches a surface acoustic wave device including a $LiNbO_3$ or $LiTaO_3$ substrate having a negative frequency change rate (TCF) (see Table 1 of Kadota et al.), **NOT** a quartz substrate having a negative temperature coefficient of delay (TCD). It is noted that TCF = -TCD (see page 9 of the previously submitted reference "Surface Acoustic Wave Device Material Data Book", Japan Electronic Industry Development Association, March 1978). Accordingly, a negative TCF as disclosed in Kadota et al. corresponds to a positive TCD. Thus, contrary to the Examiner's allegation, Kadota et al. clearly fails to teach or suggest "a quartz substrate"

and "the quartz substrate has an angle ϕ at the Euler angle (0, ϕ, θ) which is selected such that the quartz substrate has a negative temperature coefficient of delay at a predetermined propagation direction θ, and the piezoelectric thin film has a thickness H which is selected such that a fundamental mode of a leaky surface acoustic wave is excited on the quartz substrate and the surface acoustic wave device operates using the fundamental mode of the leaky surface acoustic wave" as recited in claim 1 of the present application. In fact, Kadota et al. clearly teaches away from a substrate having a negative TCD, and instead teaches a substrate having a positive TCD. It is error to find obviousness where references diverge and teach away from the invention at hand. W.L. Gore & Assoc. v. Garlock Inc., 721 F .2d 1540, 1550, 220 USPQ 330, 311 (Fed. Cir. 1983).

Furthermore, contrary to the Examiner's allegation, Kadota et al. teaches a surface acoustic wave device utilizing Love waves (see, for example, the Abstract of corresponding USP 5,432,392), **NOT** leaky waves as recited in the present claimed invention. The surface acoustic wave velocity of Love waves is relatively low, and thus, Love waves cannot be used for surface acoustic wave devices used in high frequency bands. On the other hand, the surface acoustic wave velocity of Leaky waves is much greater than that of Love waves, and thus surface acoustic wave devices, such as the present claimed invention, which utilize Leaky waves can be used in high frequency bands. Thus, Applicant respectfully submits that Kadota et al. clearly fails to teach or suggest a surface acoustic wave device in which "a fundamental mode of a leaky surface acoustic wave is excited on the quartz substrate" as recited in claim 1 of the present application.

In addition, the only θ values disclosed in Kadota et al. are 0°, 15° and 30° (see Fig. 6 and col. 6, lines 62-63). Thus, Kadota et al. clearly fails to teach or suggest "the propagation direction θ is in a range of about 85° to about 95°" as recited in the present claimed invention.

On page 2 of the outstanding Office Action, the Examiner alleged that Kadota et al. (U.S. 5,432,392) explicitly states "said quartz... a negative value of temperature

coefficient of delay". However, this is clearly incorrect. Claim 1 of Kadota et al. (U.S. 5,432,392) recites absolutely nothing regarding a temperature coefficient of delay, and certainly fails to recite "a negative value of temperature coefficient of delay" as recited in the present claimed invention. It appears that the Examiner is referring to claim 1 of Kadota (U.S. 5,719,538). However, this reference has been disqualified as prior art in the present application, for the reasons described in the Request for Reconsideration filed on June 14, 2002.

Accordingly, Applicant respectfully submits that Kadota et al. (DE '980), fails to teach or suggest the unique combination and arrangement of elements recited in claim 1 of the present application.

In view of the foregoing amendments and remarks, Applicant respectfully submits that Claim 1 is allowable over the prior art for the reasons described above. Claims 2-4 and 6-9 are dependent upon claim 1, and are therefore allowable for at least the reasons that claim 1 is allowable.

In view of the foregoing amendments and remarks, Applicant respectfully submits that this Application is in condition for allowance. Favorable consideration and prompt allowance are respectfully solicited.

To the extent necessary, Applicant petitions the Commissioner for a One-month extension of time, extending to December 20, 2002, the period for response to the Office Action dated August 20, 2002.

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The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

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VERSION WITH MARKINGS SHOWING CHANGES MADE

1. A surface acoustic wave device comprising:

a quartz substrate;

a piezoelectric thin film disposed on the quartz substrate and having a positive temperature coefficient of delay; and

an interdigital electrode disposed in contact with the piezoelectric thin film; wherein

the quartz substrate has an angle ϕ at the Euler angle $(0, \phi, \theta)$ which is selected such that the quartz substrate has a negative temperature coefficient of delay at a predetermined propagation direction θ, and the piezoelectric thin film has a thickness H which is selected such that a fundamental mode of a leaky surface acoustic wave is excited on the quartz substrate and the surface acoustic wave device operates using the fundamental mode of the leaky surface acoustic wave; and

the propagation direction θ is in a range of about 85° to about 95°.

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